

# ARO-FE Executive Bulletin

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**ARO-FE “Tech Briefs and List of Technical Titles”** The Tech Briefs describe Japanese technological advances in a wide spectrum of disciplines relevant to ARO. Japanese scientists working for ARO-FE write these Tech Briefs and compose lists of titles of articles based on information reported in Japanese newspapers such as the Nikkan Kogyo and Nikkei Sangyo Shimbun. Topics covered include fundamental science and technology, information and telecommunications, electronics, machinery and robots, automobiles, aircraft, defense, chemistry, energy, materials, architecture, housing, city development, food, medicine, and economics.

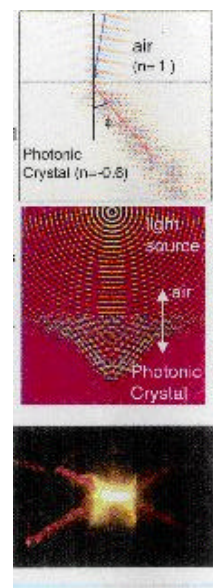
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- **Sample of TECH BRIEFS:**

**Lightwave Control by Photonic Crystals-Anomalous Propagation and Lasing Oscillation-** Masaya Notomi, Material Science Lab., NTT Basic Research Labs. NTT Science Plaza 2001, **Feb14, 2001**

Light propagation properties are determined by refractive index of materials. However, in photonic crystals, light propagation can be tuned beyond the limitation of refractive index of materials. They are currently studying the anomalous light propagation and lasing phenomena with the purpose of fully control of light propagation. Although refractive index of materials is always positive, their study revealed that light propagates in strongly modulated photonic crystals as if it experiences negative refractive index. In addition, peculiar lasing action occurs at photonic band edges, which reflects the multi-dimensional photonic band structure.

With these exotic light-propagation phenomena, NTT expects photonic crystals as new optical materials that can surpass the innovative photonic processing technologies and devices. **Figure** captions: **Top** - Negative Refraction Near the bandgap, it behaves as if it has negative refractive index. The refraction angle  $\theta$  can be negative, which is impossible for conventional materials. **Middle** - Imaging Light from a point source converges in photonic crystals. This effect realizes imaging effect, which is fundamentally different from a lens. **Bottom** - Lasing without Mirrors. It has feedback mechanism near the bandgap, thus it can lase without extrinsic mirrors. This feature suggests that various interesting feedback mechanisms can be realized.



- **Sample of LIST OF TECHNICAL TITLES:**

**State-of-the-art Stamping-Direct Nanoprinting Technology to Nanostructure Fabrication** - Atsusi Yokoo, Material Science Lab, NTT Science Plaza 2001, **Feb 14, 2001**

- **Latest List of Technical Titles of Japan Defense Agency(JDA)**

Technical Research & Development Institute (TRDI) is the sole organization of the Japan Defense Agency, which conducts research, development, and test & evaluation of military systems and equipment. Four separate Development Departments are responsible for developing ground, naval, air and guided weapons systems. Five Research Centers conduct research in their own specific areas of technology and perform engineering tests on newly developed systems own specific areas of technology and perform



engineering tests on newly developed systems and equipment at the five Test Centers located nationwide. Please click on the following Word icon for a latest Collection/ List of Technical Titles & Papers published by the Five Research Centers. The publications are in Japanese. However, *upon request, ARO-FE will be pleased to send you a translated copy of the Abstracts and arrange to translate the whole paper if you so desire.*

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